

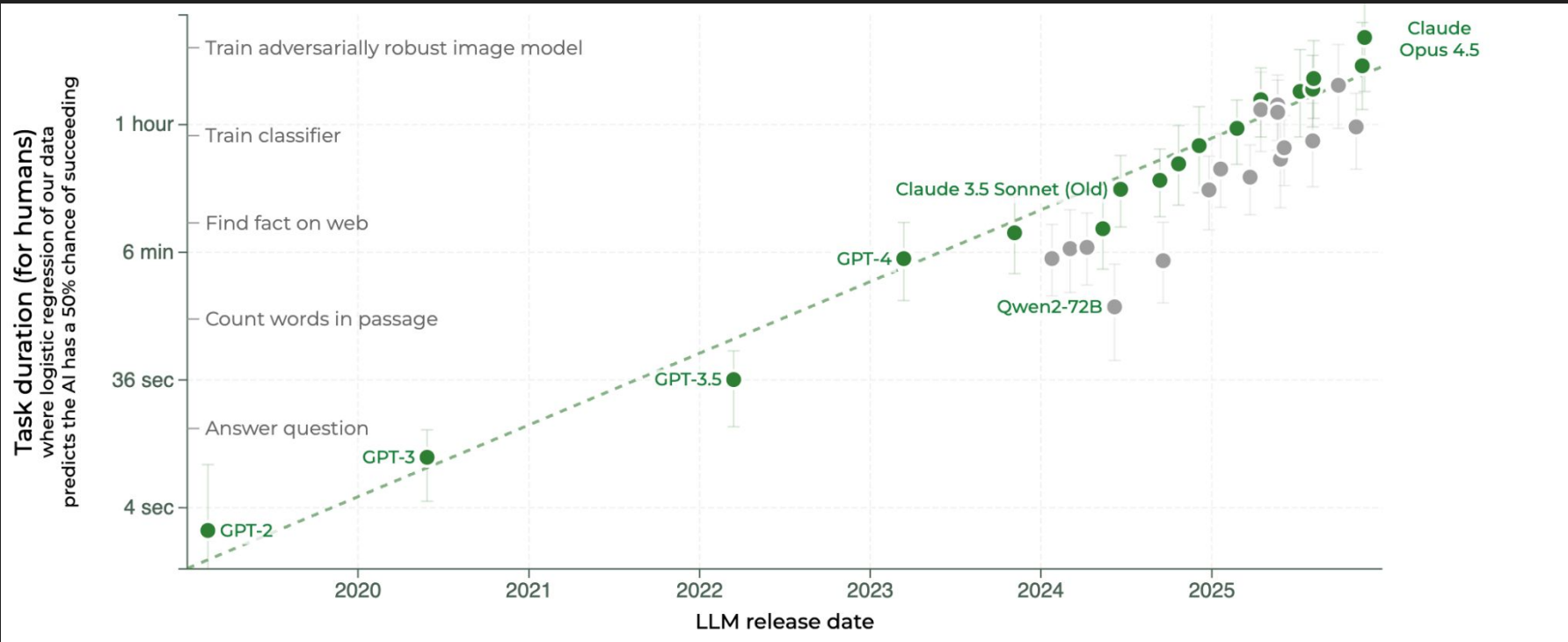
AI Agents for Design and Verification

Opportunities and Challenges

Design and Verification is Expensive and Time-Consuming

- NVIDIA spent \$10B on R&D for Blackwell GPUs.
- IC/ASIC projects commonly spend **60%** of total project time in functional verification.
- Even design engineers spend **~49%** of their time on verification tasks.

Any speedup by AI Agents could mean huge savings.



Every year, the time-horizon of tasks solvable by LLMs grows by **10x**.

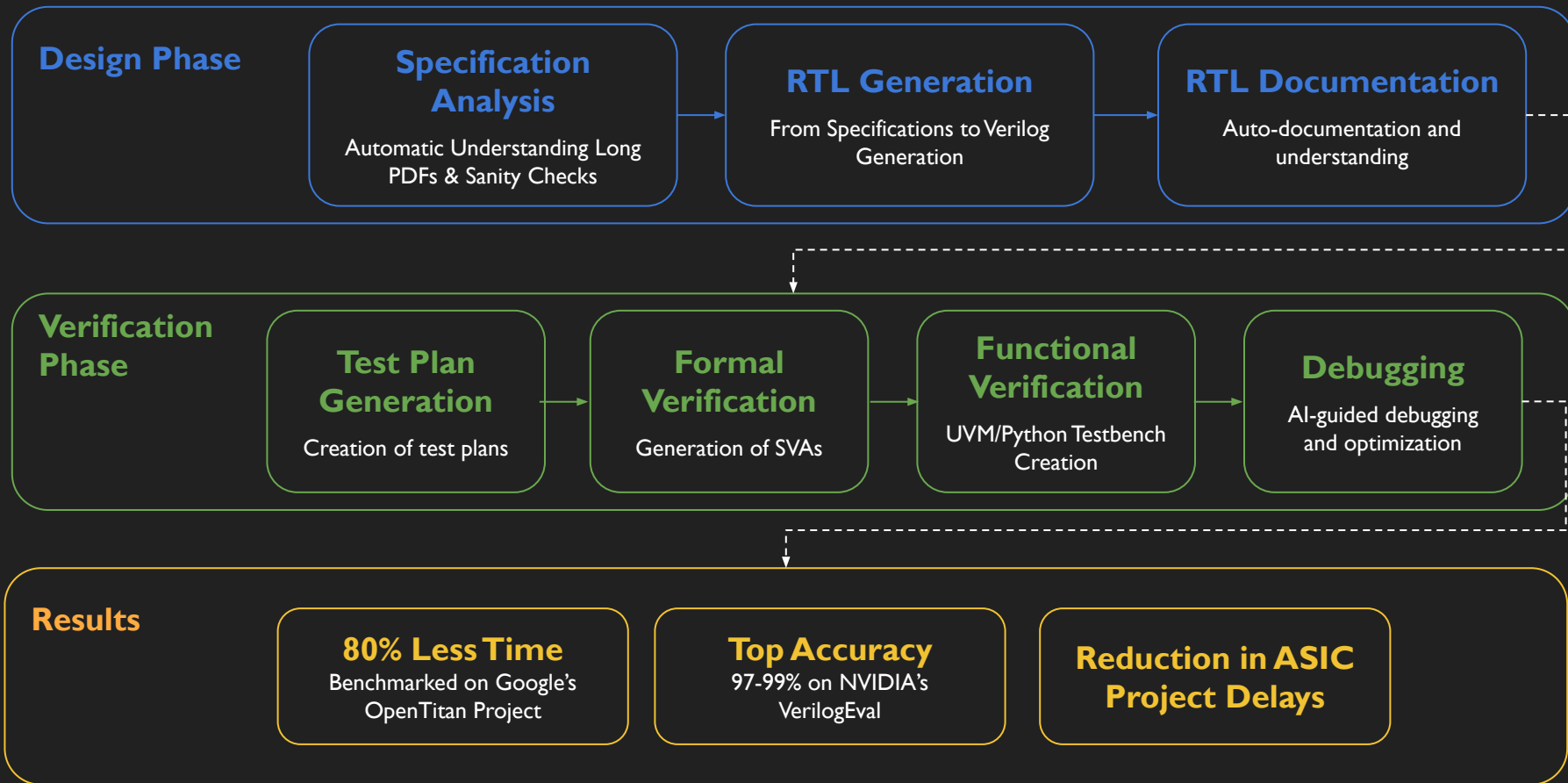
Behind the growth are not just single LLM generations, but **AI Agents**.

What are AI Agents?

Like human engineers, AI Agents:

- Make plans
- Take actions
- Interact with the environment.

ChipAgents™: Agentic AI Powered Design & Verification Flow

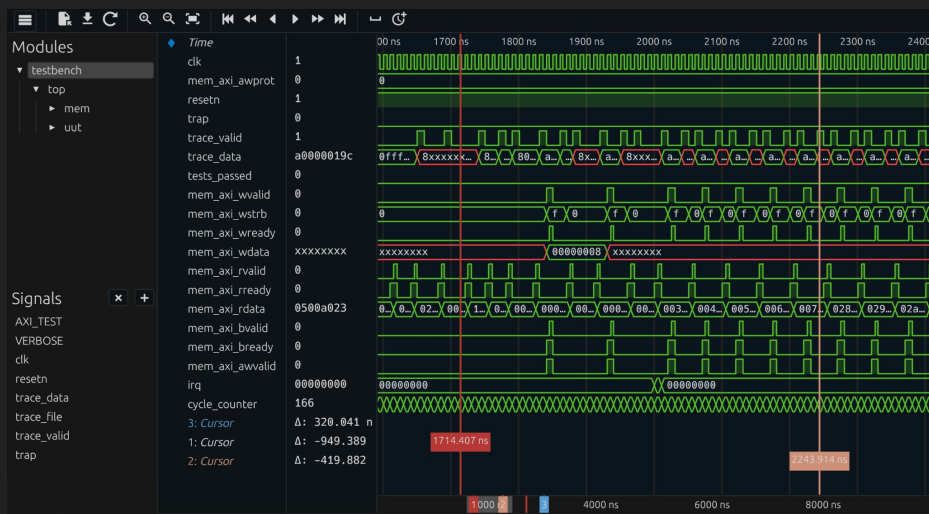


Examples of Agents for Design and Verification

- Waveform Agent
- Root Cause Analysis

Challenges with Waveform Debugging

- Waveforms dumped by modern systems are large, time consuming to debug.
- Debugging requires intimate knowledge of signal relationships.

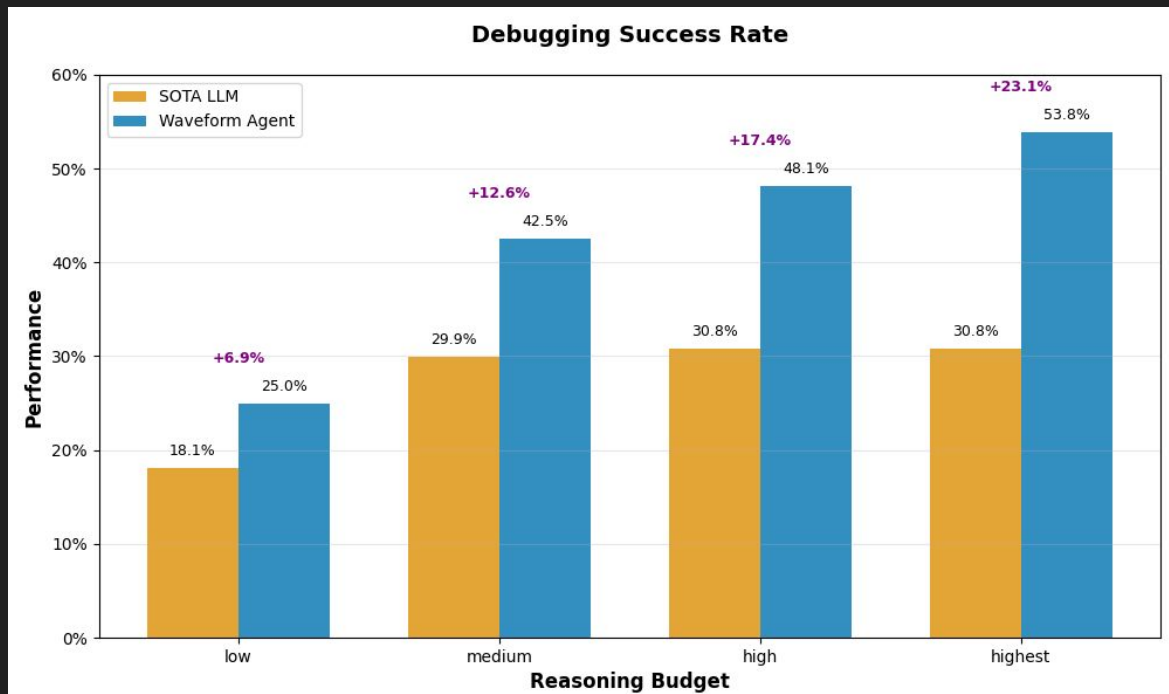


How do engineers debug today?

- **Waveform Viewing Software** ← Driven by engineer, only localization
/ **Signal Tracing**
- **Anomaly Detection /**
Pattern Recognition ← Only signal data, not flexible
- **Formal Tools** ← Doesn't scale to larger systems

Waveform Agent @ChipAgents

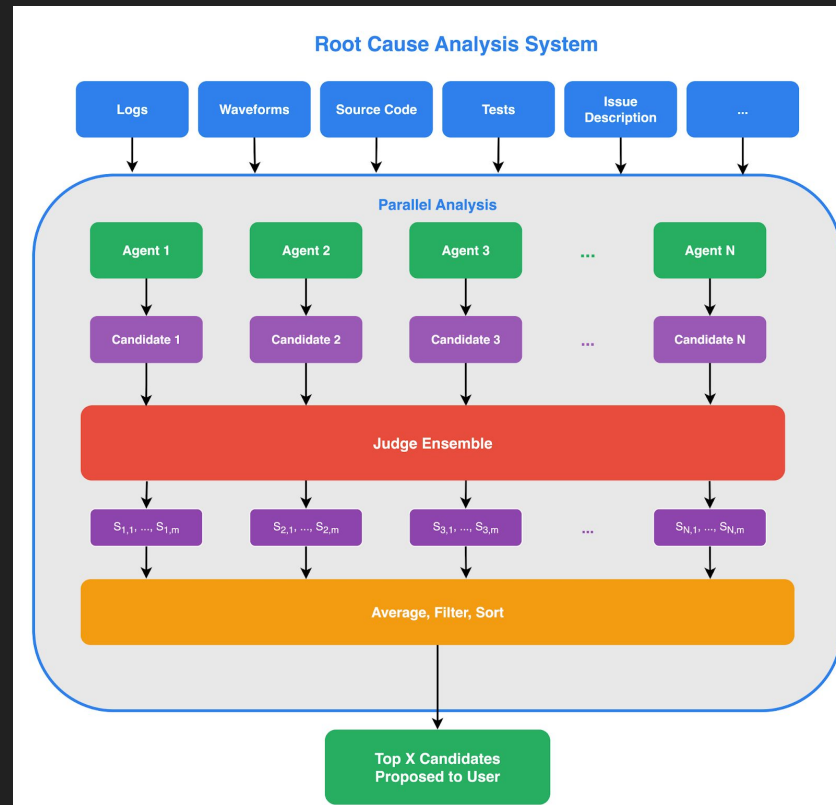
Understand waveforms, trace signals, and localize bugs in RTL.



Waveform Agent as a Component for Root Cause Analysis

We apply inference-scaling techniques to root cause analysis, trading compute for better debugging accuracy.

This is built upon Waveform Agent's abilities.



Root Cause Analysis @ChipAgents

Evaluated on

- IPs as complex as 100k lines of RTL.
- Bugs with 6 clock domains and 4 protocols involved.

